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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

PLANS FOR BARK BEETLE CONTROL,

FIGUEROA AREA, CAMP F-117, SANTA BARBARA NAT. FOREST

by

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Forest Supervisor,
Santa Barbara, Calif.

Dear Mr. Nash-Boulden:

Enclosed are two copies of plans for the Figueroa insect control work, one of which is for transmittal to the Camp Superintendent. A copy has been sent direct to Mr. Kelley, in order that he will have the instructions as to methods immediately available.

Very truly yours,

J. C. Elliott,
Senior Entomologist.

Enclosures

JCE/C
cc to Mr. Browne/

PLANS FOR BARK BEETLE CONTROL,
FIGUEROA AREA, CAMP F-117, SANTA BARBARA NAT. FOREST

The establishment of the CCC Camp at Figueroa Ranger Station has made possible a sustained control campaign against the western pine beetle infestation in the Figueroa and East Pinery areas.

Insects have taken a fairly heavy toll of the mature ponderosa pine and Coulter pine in areas adjacent to the Figueroa Camp, and much of the cover on the recreational and campground areas has been lost. A series of reports, on file in the office of the Forest Supervisor at Santa Barbara, give something of the history of bark beetle infestations and of previous efforts to control them.

Conditions in the Figueroa Areas

Three areas have been recognized as infestation units in past work; these are

1. East Pinery - - - - - 400 acres
2. Figueroa - - - - - - -1100 "
3. West Pinery or Zaca - 1100 "

In 1921 it was found that the infestation had been increasing in all these areas, and during the winter of 1922 a control campaign was carried on in which 65 trees were felled and the infested bark treated. The following year but 13 infested trees were found in the areas covered by the control work.

The infestation did not become aggressive again until about 1930. Since then there has been a disturbing increase in the number of dying trees. This is best illustrated by the following table of annual kill on the East Pinery, which was cruised by P.C. Johnson and James Kelley in June, 1933:

Number and Volume of Trees Killed Annually by the Western Pine Beetle on the East Pinery (400 acres), 1930-1932 inclusive

Year	No. Trees Killed	Volume board feet
1930	5	5,000*
1931	29	50,560
1932	92	100,300

*Estimated

At the time of the survey, June 21-26, five new trees were marked which had already been attacked by beetles that had recently begun the summer flight and attack of 1933. Just how many trees may be attacked during the course of the 1933 season cannot now be estimated, as this will depend upon seasonal conditions affecting the abundance of the insects. If summer control work is maintained, the number of trees attacked should be so reduced by the close of the season that losses will be materially less than those of 1932.

Proposed Plans for Control Work

Control work carried on during the summer season offers the best means of reducing bark beetle infestations on these areas. This is because the labor of the CCC camp will be available during this period, and because the use of solar heat as a method of destroying broods in the bark will eliminate the dangers of the burning methods. Even during the winter months the fire hazard makes the burning method a difficult one to use under conditions found on a large part of the area.

Control as it will be donducted on this project will consist of two phases: (1) spotting (selection and marking of the infested trees) and (2) control work (falling and treatment of infested bark).

Area to be Included

The Figueroa and East Pinery regions are situated so close together that both should be treated if results are to be effective. This is because the flight of beetles from one area into the other may be expected, and if only one area is treated it may become reinfested by beetles coming in from the other area.

The West Pinery or Zaca Peak area is at a sufficient distance from Figueroa Mountain, and is separated by a wide break in type, so that it is not expected that infestation left untreated in that unit will materially affect the results of work carried out in Figueroa and East Pinery. Because of campground and recreational-area values, priority in the summer control work should be given to the Figueroa and East Pinery units. These should be spotted intensively and an attempt made to treat all trees attacked during the summer as soon as they can be located. Work in the Zaca area should be carried on if possible; but if time is not available to carry on the work in all three areas during the summer, attention should be given to Figueroa and East Pinery, and the Zaca infestation left for a clean-up with a fall campaign.

Spotting

This phase of the work requires considerable technical knowledge, and will be carried on by the spotter foreman assigned to the camp. He will cruise, map and mark the infested trees during the season and will direct the work of the control crew as to methods of treatment. James Kelley has been assigned as spotter foreman of the camp, and approximately ten days in June were given over by P.C. Johnson of the Bureau of Entomology in demonstrating the methods of spotting and control that will be used. These, therefore, will not be given in great detail in this outline.

It is advisable that a cruise be made of the Figueroa and East Pinery units at least once a month throughout the summer. Under favorable conditions the western pine beetle can develop a complete brood in six weeks, so the interval between cruises should be timed accordingly. A cruise of the West Pinery on Zaca Peak should be made at the first opportunity to determine the extent of beetle losses there. Control meas-

ures on this unit should be undertaken if time is available after the other two areas have been taken care of. In case summer work on the Zaca area is found to be inadvisable, plans should be made for a thorough eradication program in the fall.

Control Work

Crew Organization

The number of trees to be treated will naturally govern the amount of labor needed for the control work. Judging from the results of the cruise made June 20-29, one three-man treating crew may be sufficient to handle the summer control program. This crew should be chosen as soon as possible, and will require men skilled in timber falling. It is essential to maintain this same crew or crews throughout the entire summer control period, as their efficiency will increase as the work progresses, and the necessity of training new men each time will be eliminated. When not in use for insect control work, the crew may still be kept intact for snag disposal work, road clearing etc. If a heavy increase occurs in the summer infestation, the control crew may also be used to assist in the survey work with little additional training

Timing of Control Clean-up

The brood stages of the infested trees found during the periodic cruises will determine the time for control; i.e., trees containing advanced stages, such as full-grown larvae, pupae or new adults, should be treated as soon after the cruise as possible, whereas trees containing new attacks, eggs or young larvae can usually be safely left for two or three weeks before treating. The control clean-up on each unit should ordinarily be not less than,one month apart.

Types of Trees to be Treated

Only trees killed by the 1933-summer broods of the western pine beetle or flathead infestation need be treated, since trees killed by previous broods are abandoned at this time. Trees with green cambium at the base may be cut for treatment if the entire foliage has faded, as experience has shown that such trees usually contain good broods above the base.

When marking trees for treating, it is advisable to mark for observation such trees as contain new attacks, eggs, or very young larvae. This will leave the spotter opportunity for further examination of the successfulness of the attack. Often such broods fail to develop beyond the initial stages of attack and therefore such trees need not be treated.

Methods

Control methods on this area should be limited to one of the following:

1. solar heat
2. pit burning
3. oil spraying

Solar Heat. In this method, the tree to be treated is felled as near as possible into an open area and the limbs are cut and piled. The infested bark is then stripped from the trunk and placed in such a position that the sun's rays will strike the inner surface of the bark for several hours during the day. The heat from the sun's rays will be found most effective between 10 a.m. and 3 p.m., and by also placing the bark surface at right angles to the axis of the rays.

The following points should be noted in placing bark for solar heat treatment:

1. Eliminate any possibility of shading of the bark from nearby trees, brush or rocks. This may necessitate clearing an opening or carrying the bark some distance into an open area;

2. Do not place bark so that one piece will overlap and shade another;

3. Break up large pieces of bark so that curvature is eliminated and all the surface is at right angles to the sun's rays;

4. Place bark against logs, rocks etc., so that any reflected heat may be utilized;

5. The ground should be flat or exposed to the southeast, south or southwest for best results.

It will be necessary to examine the bark periodically after it has been placed in the sun to determine the success of the treatment. On an ordinary summer day thebrood may be killed in one hour if care has been exercised in placing the bark. The condition of the brood may be determined by testing a few samples. Shaving a cross-section of the bark with a sharp knife will expose the brood. The immature stages of the beetle will assume a brown or black color when killed by the solar heat method. If such examinations show that solar heat is proving of little effect upon the broods, the bark should be moved to a more exposed location or treated by some other method.

Pit Burning. Since this method employs the use of fire, it should be used only after continued failure of solar heat, or in locations where use of the latter is impracticable. The fire hazard is extremely great on the control area, and the careful use of fire for control methods cannot be overemphasized. Pit burning should be used only where neither of the other two methods is feasible, and where absolute safety in the use of fire is assured.

On long north slopes, where conditions are not favorable for solar heat treatment and the bark cannot be conveniently carried to an opening exposed to the direct rays of the sun, the bark may be treated by pit burning. If this method must be used, the infested bark is stripped from the fallen trunk and placed in an open pit in the ground for burning.

The pit should be dug one or two feet deep into mineral soil, and the humus and duff should be cleared away from its rim for a safe distance. Having cleared away the inflammable material from the pit, the chief danger will be in flying sparks and cinders from the burning bark. This may be reduced by delaying burning until all wind has subsided and by burning only small portions of bark at a time, so as to keep the size of the fire to a minimum.

The pit-burning method may be employed as fall conditions come on which reduce the period of fire hazard and solar heat becomes less effective because of lower daily temperatures.

Oils. The Standard Oil Company of California is experimenting with certain chemical-petroleum sprays for use in bark beetle control work. Arrangements are being made with the Research Laboratory at Richmond to ship 30 gallons of this oil to the Figueroa camp in order to give it a test on this project. If found to be effective it can be employed to supplement the solar heat method. It may also be quite useful in the fall and winter work in order to restrict the use of fire.

Oil can be applied to the outer bark without peeling by means of a back pump and nozzle or with a brush. About five gallons are necessary to cover the bark on a 26" tree. It may also be applied to the bark after it is peeled.

Types of Bark to be Peeled and Treated

The following types of bark should be peeled and treated:

1. Bark infested with western pine beetle broods
2. " flathead "
3. " Ips " (peeled only)
4. Green bark. No green bark should ever be left on down trees, as they are a source of reinfestation by attracting bark beetles.

Types of Bark to be Left on Log

The followingtypes of bark need not be peeled or treated:

1. Bark abandoned by the western pine beetle
2. " flathead beetles
3. " Ips "
4. New attacks of the western pine beetle. This bark can be left until the brood develops enough to loosen the bark, but the bark must be treated when this stage is reached.

J. M. MILLER,
Senior Entomologist

P.C. Johnson,
Field Aide.

Berkeley, Calif.,
July 15, 1933.